CLAIM AMENDMENTS
CLEANED UP AND RENUMBERED

1. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the area-specific resistance for protons is in the range of 0.01-100 $\Omega.cm^2$ at at least one temperature between 220°C and 550°C,

wherein the metal or metal in the metal hydride is selected from the group consisting of Pd, PdAg, PdCu, Ti, $LaNi_5$, TiFe and CrV_2, V/Ni/Ti, V/Ni and V/Ti.

2. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the area-specific resistance for protons is in the range of 0.01-100 $\Omega.cm^2$ at at least one temperature between 220°C and 550°C,

wherein the electronically-insulating proton conductor coating is selected from the group consisting of:

mesoporous zirconium phosphate pyrophosphate, $Zr(P_2O_7)_{0.81}$;

$Ba_3Ca_{1.18}Nb_{1.82}O_{8.73}$-$H_2O$;

$Cs_5H_3(SO_4)_4.0.5H_2O$;

a hydrate of $SnCl_2$;

silver iodide tetratungstate $Ag_{26}I_{18}W_4O_{16}$;

KH_2PO_4;

tetraammonium dihydrogen triselenate, $(NH_4)_4H_2(SeO_4)_3$;

$CsDSO_4$;

CsH_2PO_4;

$Sr[Zr_{0.9}Y_{0.1}]O_{3-\delta}$;

a silica-polyphosphate composite containing ammonium ions;

$La_{0.9}Sr_{0.1}Sc_{0.9}Mg_{0.1}O_3$; and

$BaCe_{0.9-x}Zr_xM_{0.1}O_{3-\delta}$ where M is Gd or Nd and x = 0 to 0.4.

3. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the area-specific resistance for protons is in the range of 0.01-100 $\Omega.cm^2$ at at least one temperature between 220°C and 550°C,

wherein the electronically-insulating proton-conducting coating consists of

$Ba_3Ca_{1.18}Nb_{1.82}O_{8.73}$-$H_2O$;

CsH_2PO_4;

$Sr[Zr_{0.9}Y_{0.1}]O_{3-\delta}$;

polyphosphate composite containing19.96 wt% NH_4^+, 29.3 wt% P, 1.51 wt% Si;

$La_{0.9}Sr_{0.1}Sc_{0.9}Mg_{0.1}O_3$; or

$BaCe_{0.9-x}Zr_xM_{0.1}O_{3-\delta}$ where M is Gd or Nd and x = 0 to 0.4.

4. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the area-specific resistance for protons is in the range of 0.01-100 $\Omega.cm^2$ at at least one temperature between 220°C and 550°C,

wherein the area-specific resistance for protons at at least one temperature between 220ºC and 550ºC is about 0.150 $\Omega.cm^2$.

5. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the ASR for protons at at least one temperature between 220°C and 550°C is in the range shown for Nafion® 117 in Figure 10:

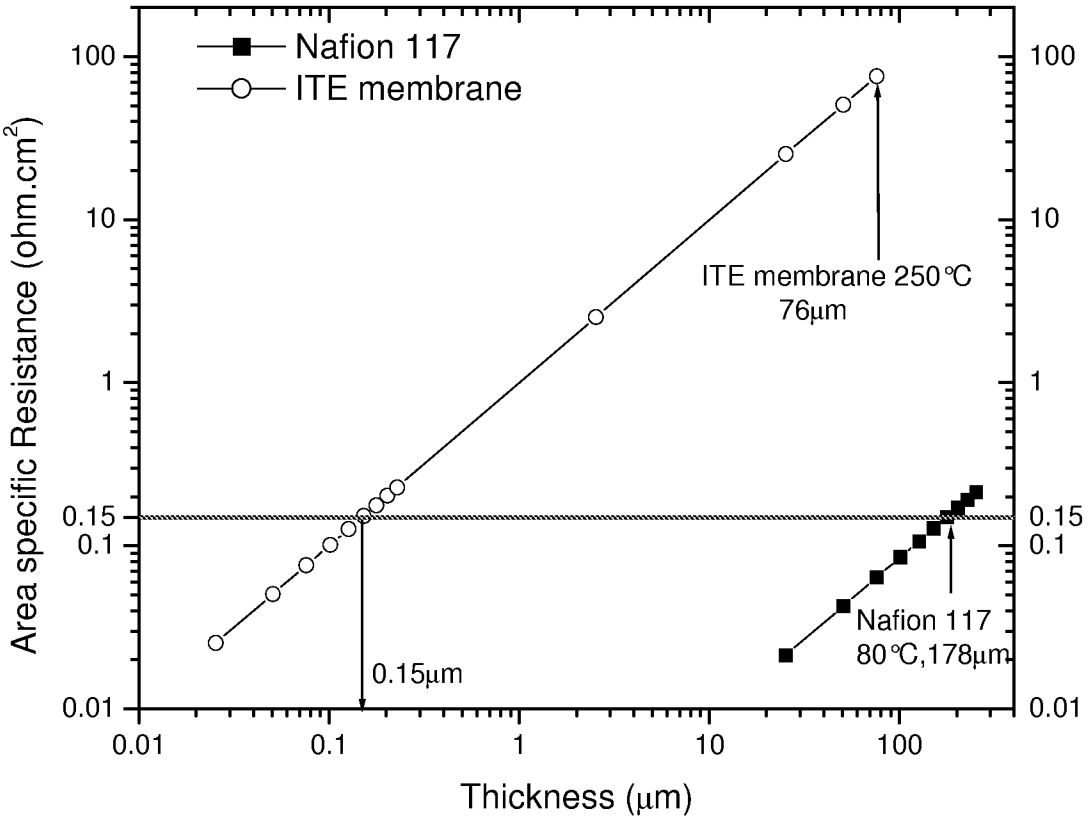

Figure 10;

wherein the metal or metal in the metal hydride is selected from the group consisting of Pd, PdAg, PdCu, Ti, $LaNi_5$, TiFe and CrV_2, V/Ni/Ti, V/Ni and V/Ti.

6. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the ASR for protons at at least one temperature between 220°C and 550°C is in the range shown for Nafion® 117 in Figure 10:

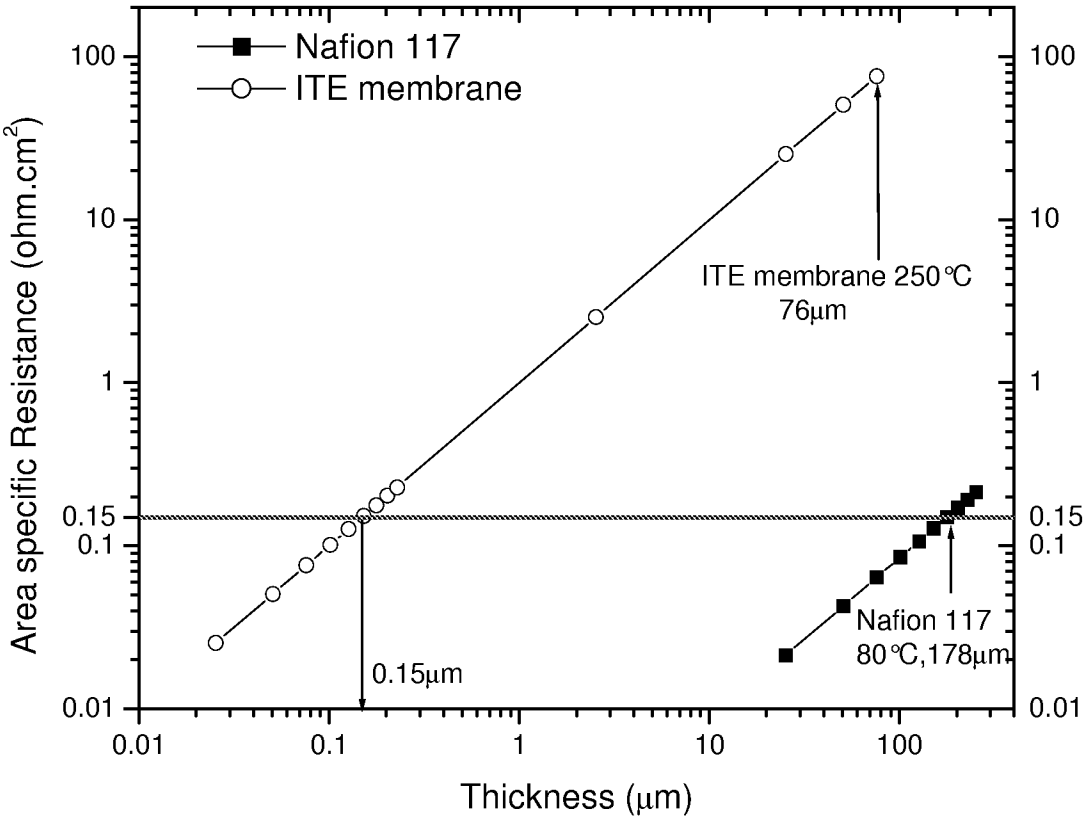

Figure 10;

wherein the electronically-insulating proton-conducting coating is selected from the group consisting of:

mesoporous zirconium phosphate pyrophosphate, $Zr(P_2O_7)_{0.81}$;

$Ba_3Ca_{1.18}Nb_{1.82}O_{8.73}$-$H_2O$;

$Cs_5H_3(SO_4)_4.0.5H_2O$;

a hydrate of $SnCl_2$;

silver iodide tetratungstate $Ag_{26}I_{18}W_4O_{16}$;

KH_2PO_4;

tetraammonium dihydrogen triselenate, $(NH_4)_4H_2(SeO_4)_3$;

$CsDSO_4$;

CsH_2PO_4;

$Sr[Zr_{0.9}Y_{0.1}]O_{3-\delta}$;

a silica-polyphosphate composite containing ammonium ions;

$La_{0.9}Sr_{0.1}Sc_{0.9}Mg_{0.1}O_3$; and

$BaCe_{0.9-x}Zr_xM_{0.1}O_{3-\delta}$ where M is Gd or Nd and x = 0 to 0.4.

7. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the ASR for protons at at least one temperature between 220°C and 550°C is in the range shown for Nafion® 117 in Figure 10:

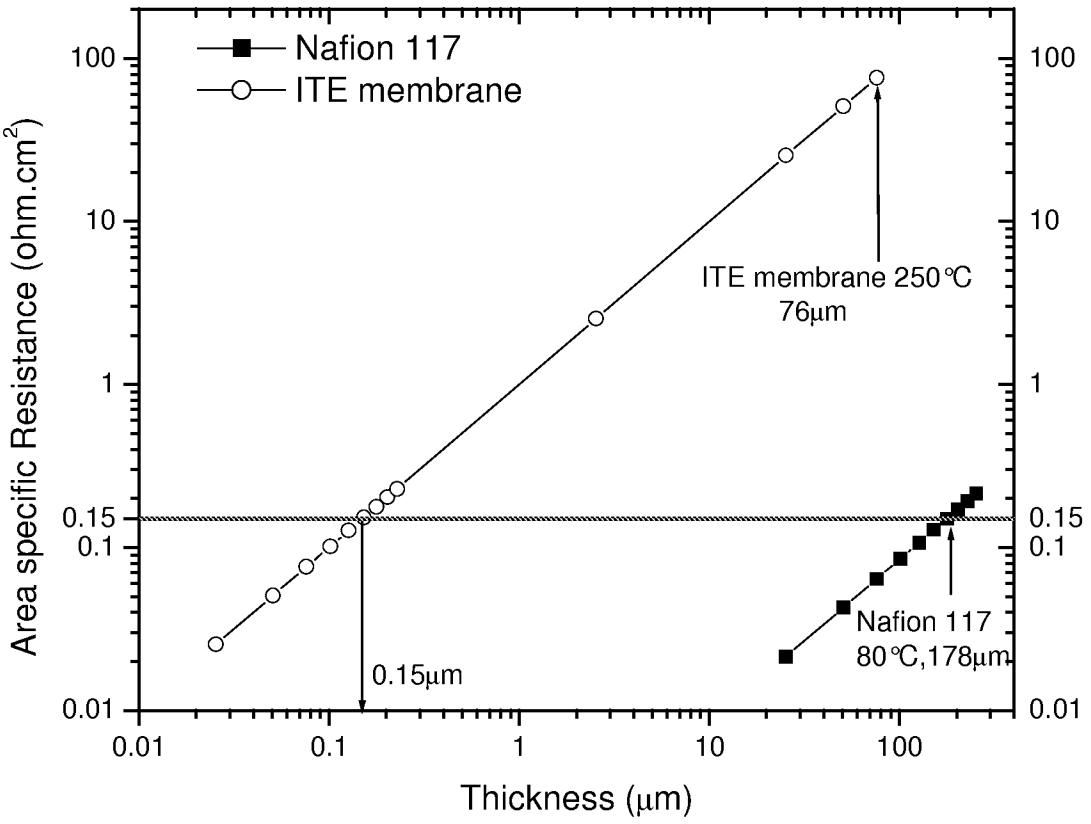

Figure 10;

wherein the electronically-insulating proton-conducting coating consists of $Ba_3Ca_{1.18}Nb_{1.82}O_{8.73}$-$H_2O$;

CsH_2PO_4;

$Sr[Zr_{0.9}Y_{0.1}]O_{3-\delta}$;

polyphosphate composite containing19.96 wt% NH_4^+, 29.3 wt% P, 1.51 wt% Si;

$La_{0.9}Sr_{0.1}Sc_{0.9}Mg_{0.1}O_3$; or

$BaCe_{0.9-x}Zr_xM_{0.1}O_{3-\delta}$ where M is Gd or Nd and x = 0 to 0.4.

8. A proton-conducting membrane designed to serve as an electrolyte in a fuel cell, which membrane consists essentially of

a single metal or metal hydride support, wherein

one or both faces of said support is coated with an electronically-insulating proton-conducting coating, which coating consists of an inorganic material that contains no liquid phase, said coating having a thickness such that the ASR for protons at at least one temperature between 220°C and 550°C is in the range shown for Nafion® 117 in Figure 10:

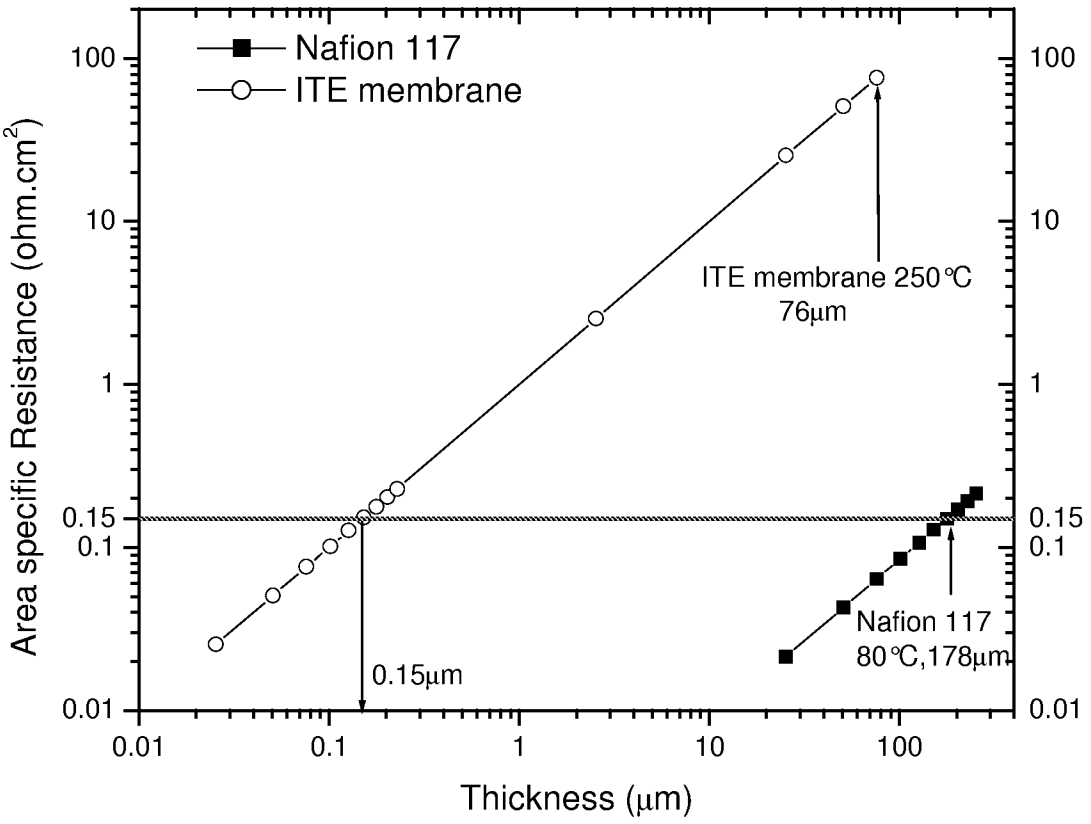

Figure 10;

wherein the area-specific resistance for protons at at least one temperature between 220°C and 550°C is about 0.150 $\Omega.cm^2$.